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TANIYA SHERLYN

Adhesion in Microelectronics Springer Science & Business Media
The ever-increasing miniaturization of digital electronic components is hampering the conventional testing of Printed Circuit Boards (PCBs) by means of bed-of-nails fixtures. Basically this is caused by the very high scale of integration of ICs, through which packages with hundreds of pins at very small pitches of down to a fraction of a millimetre, have become available. As a consequence the trace distances between the copper tracks on a printed circuit board cmne down to the same value. Not only the required small physical dimensions of the test nails have made conventional testing unfeasible, but also the complexity to provide test signals for the many hundreds of test nails has grown out of limits. Therefore a new board test methodology had to be invented. Following the evolution in the IC test technology. Boundary-Scan testing hm; become the new approach to PCB testing. By taking precautions in the design of the IC (design for testability), testing on PCB level can be simplified 10 a great extent. This condition has been essential for the success of the introduction of Boundary-Sc,m Test (BST) at board level.
Pollutants and Water Management McGraw Hill Professional
ELECTRONICS MANUFACTUIRNG WITH LEAD-FREE, HALOGEN-FREE, AND CONDUCTIVE-ADHESIVE MATERIALS This comprehensive guide provides cutting edge information on lead-free, halogen-free, and conductive-adhesive technologies and their application to low-cost, high-density, reliable, and green products. Essential for electronics manufacturing and packaging professionals who wish to master lead-free, halogen-free, and conductive-adhesive problem solving methods, and those demanding cost-effective designs and high-yield environmental benign manufacturing processes, this valuable reference covers all aspects of this fast-growing field. Written for design, materials, process, equipment, manufacturing, reliability, component, packaging, and system engineers, and technical and marketing managers in electronics and photonics packaging and interconnection, this book teaches a practical understanding of the cost, design, materials, process, equipment, manufacturing, and reliability issues of lead-free, halogen-free, and conductive-adhesive technologies. Among the topics explored: * Chip (wafer) level interconnects with lead-free solder bumps * Lead-free solder wafer bumping with micro-ball mounting and paste printing methods * Lead-free solder joint reliability of WLCSPs on organic and ceramic substrates * Chip (wafer) level interconnects with solderless bumps such as Ni-Au, Au, and Cu, Cu wires, Au wires, Au studs, and Cu studs * Design, materials, process, and reliability of WLCSPs with solderless interconnects on PCB/substrate * Halogen-free molding compounds for PQFP, PBGA, and MAP-PBGA packages * Environmentally benign die-attach films for PQFP and PBGA packages and lead-free die-attach bonding techniques for IC packaging * Environmental issues for conventional PCBs and substrates * Some environmentally conscious flame-retardants for PCBs and organic substrates * Emerging technologies for fabricating environmental friendly PCBs such as design for environment, green PCB manufacturing, and environmental safety * Lead-free soldering activities such as legislation, consortia programs, and regional preferences on lead-free solder alternatives * Criteria, development approaches, and varieties of alloys and properties of lead-free solders * Physical, mechanical, chemical, electrical, and soldering properties of lead-free solders * Manufacturing process and performance of lead-free surface finishes for both PCB and component applications * Implementation and execution challenges of lead-free soldering, especially for the reflow and wave soldering process * Fundamental understanding of electrically conductive adhesive (ECA) technology * Effects of lubricant removal and cure shrinkage on ECAs * Mechanisms underlying the contact resistance shifts of ECAs * Effects of electrolytes and moisture absorption on contact resistance shifts of ECAs * Stabilization of contact resistance of ECAs using various additives
The Boundary-Scan Handbook Springer
This volume presents detailed descriptions of methods for evaluating, monitoring and assessing bioremediation of soil contaminated with organic pollutants or heavy metals. Traditional soil investigation techniques, including chemical, physical and microbiological methods, are complemented by the most suitable modern methods, including bioreporter technology, immunological, ecotoxicological and molecular assays. Step-by-step procedures, lists of required equipment and reagents and notes on evaluation and quality control allow immediate application
Soldering Handbook John Wiley & Sons
This volume provides a comprehensive reference for graduate students and professionals in both academia and industry on the fundamentals, processing details, and applications of 3D microelectronic packaging, an industry trend for future microelectronic packages. Chapters written by experts cover the most recent research results and industry progress in the following areas: TSV, die processing, micro bumps, direct bonding, thermal compression bonding, advanced materials, heat dissipation, thermal management, thermal mechanical modeling, quality, reliability, fault isolation, and failure analysis of 3D microelectronic packages. Numerous images, tables, and didactic schematics are included throughout. This essential volume equips readers with an in-depth understanding of all aspects of 3D packaging, including packaging architecture, processing, thermal mechanical and moisture related reliability concerns, common failures, developing areas, and future challenges, providing insights into key areas for future research and development.
Analog and Mixed-Signal Boundary-Scan Linköping University Electronic Press
This book contains more than the IEEE Standard 1149.4. It also contains the thoughts of those who developed the standard. Adam Osseiran has edited the original writings of Brian Wilkins, Colin Maunder, Rod Tulloss, Steve Sunter, Mani Soma, Keith Lofstrom and John McDermid, all of whom have personally contributed to this standard. To preserve the original spirit, only minor changes were made, and the reader will sense a chapter-to-chapter variation in the style of expression. This may appear awkward to some, although I found the lack of monotonicity refreshing. A system consists of a specific organization of parts. The function of the system cannot be performed by an individual part or even a disorganized collection ofthe same parts. Testing has a system-like characteristic. Testing of a system does not follow directly from the testing of its parts, and a system built with testable parts can sometimes be impossible to test. Therefore, testability of the system must be organized. Some years ago, the IEEE published the boundary-scan Standard 1149.1. That Standard provided an architecture for digital VLSI chips. The chips designed with the 1149.1 architecture can be integrated into a testable system. However, many systems today contain both analog and digital chips. Even if all digital chips are compliant with the standard, the testability of a mixed-signal system cannot be guaranteed. The new Standard 1149.4, described in this book, extends the previous architecture to mixed-signal systems.
The Printed Circuit Designer's Guide To... Thermal Management Springer
This leading-edge circuit design resource offers the knowledge needed to quickly pinpoint transmission problems that can compromise circuit design. Discusses both design and debug issues at gigabit per second data rates.
Interfacial Compatibility in Microelectronics World Scientific
With the proliferation of packaging technology, failure and reliability have become serious concerns. This invaluable reference details processes that enable detection, analysis and prevention of failures. It provides a comprehensive account of the failures of device packages, discrete component connectors, PCB carriers and PCB assemblies.
Mems Packaging CRC Press
Interfaces between dissimilar materials are met everywhere in microelectronics and microsystems. In order to ensure faultless operation of these highly sophisticated structures, it is mandatory to have fundamental understanding of materials and their interactions in the system. In this difficult task, the “traditional” method of trial and error is not feasible anymore; it takes too much time and repeated efforts. In Interfacial Compatibility in Microelectronics, an alternative approach is introduced. In this revised method four fundamental disciplines are combined: i) thermodynamics of materials ii) reaction kinetics iii) theory of microstructures and iv) stress and strain analysis. The advantages of the method are illustrated in Interfacial Compatibility in Microelectronics which includes: solutions to several common reliability issues in microsystem technology, methods to understand and predict failure mechanisms at interfaces between dissimilar materials and an approach to DFR based on deep understanding in materials science, rather than on the use of mechanistic tools, such as FMEA. Interfacial Compatibility in Microelectronics provides a clear and methodical resource for graduates and postgraduates alike.
Adhesives Technology for Electronic Applications McGraw Hill Professional
The technical application of screen and stencil printing has been state of the art for decades. As part of the subtractive production process of printed circuit boards, for instance, screen and stencil printing play an important role. With the end of the 20th century, another field has opened up with organic electronics. Since then, more and more functional layers have been produced using printing methods. Printed electronics devices offer properties that give almost every freedom to the creativity of product development. Flexibility, low weight, use of non-toxic materials, simple disposal and an enormous number of units due to the production process are some of the prominent keywords associated with this field. Screen printing is a widely used process in printed electronics, as this process is very flexible with regard to the materials that can be used. In addition, a minimum resolution of approximately 30 µm is sufficiently high. The ink film thickness, which can be controlled over a wide range, is an extremely important advantage of the process. Depending on the viscosity, layer thicknesses of several hundred nanometres up to several hundred micrometres can be realised. The conversion and storage of energy became an increasingly important topic in recent years. Since regenerative energy sources, such as photovoltaics or wind energy, often supply energy intermittently, appropriate storage systems must be available. This applies to large installations for the power supply of society, but also in the context of autarkic sensors, such as those used in the Internet of Things or domestic/industrial automation. A combination of micro-energy converters and energy storage devices is an adequate concept for providing energy for such applications. In this thesis the above mentioned keywords are addressed and the feasibility of printed thermoelectric energy converters and supercapacitors as energy storage devices are investigated. The efficiency of thermoelectric generators (TEG) is low, but in industrial environments, for example, a large amount of unused low temperature heat energy can be found. If the production costs of TEGs are low, conversion of this unused heat energy can contribute to increasing system efficiency. Additionally, printing of supercapacitor energy storage devices increases the usability of the TEG. It is appropriate to use both components as complementary parts in an energy system. Den tekniska tillämpningen av skärm- och stencilutskrift har varit toppmoderna i årtionden. Som en del av den subtraktiva produktionsprocessen av tryckta kretskort spelar exempelvis skärm- och stencilutskrift en viktig roll. I slutet av 1900-talet har ett annat fält öppnat med organisk elektronik. Sedan dess har allt fler funktionella lager producerats med hjälp av tryckmetoder. Tryckta elektronikanordningar erbjuder egenskaper som ger nästan all frihet till kreativiteten i produktutvecklingen. Flexibilitet, låg vikt, användning av giftfria material, enkelt bortskaffande och ett enormt antal enheter på grund av produktionsprocessen är några av de framträdande nyckelord som hör till detta område. Skärmtryck är en allmänt använd process i tryckt elektronik, eftersom processen är mycket flexibel med avseende på material som kan användas. Dessutom är en minsta upplösning på cirka 30 µm tillräckligt bra. Bläckfilmens tjocklek, som kan styras över ett brett område, är en extremt viktig fördel med processen. Beroende på viskositeten kan skikttjockleken på flera hundra nanometer upp till flera hundra mikrometer realiseras. Energikonvertering och lagring har blivit ett allt viktigare ämne de senaste åren. Eftersom regenerativa energikällor, såsom fotovoltaik eller vindkraft, ofta levererar energi intermittent, måste lämpliga lagringssystem vara tillgängliga. Detta gäller stora installationer för samhällets strömförsörjning, men också inom ramen för autarkiska sensorer, som de som används i saker av saker eller inhemsk / industriell automation. En kombination av mikroenergiomvandlare och energilagringsenheter är ett lämpligt koncept för att tillhandahålla energi för sådana applikationer. I denna avhandling behandlas ovan nämnda nyckelord. Genomförbarhet av tryckta termoelektriska energiomvandlare och superkapacitorer som energilagringsenheter undersöks. Effektiviteten hos termoelektriska generatorer (TEG) är låg, men i industriella miljöer kan exempelvis en stor mängd oanvänd låg temperatur värmeenergi hittas. Om produktionskostnaderna för TEG är låga kan konvertering av denna oanvända värmeenergi bidra till ökad systemeffektivitet. Dessutom ökar utskrift av superkapacitorer användbarheten hos TEG. Det är lämpligt att använda båda komponenterna.
Advanced Flip Chip Packaging Springer
A foreword is usually prepared by someone who knows the author or who knows enough to provide additional insight on the purpose of the work. When asked to write this foreword, I had no problem with what I wanted to say about the work or the author. I did, however, wonder why people read a foreword. It is probably of value to know the background of the writer of a book; it is probably also of value to know the background of the individual who is commenting on the work. I consider myself a good friend of the author, and when I was asked to write a few words I felt

honored to provide my view of Ray Prasad, his expertise, and the contribution that he has made to our industry. This book is about the industry, its technology, and its struggle to learn and compete in a global market bursting with new ideas to satisfy a voracious appetite for new and innovative electronic products. I had the good fortune to be there at the beginning (or almost) and have witnessed the growth and excitement in the opportunities and challenges afforded the electronic industries' engineering and manufacturing talents. In a few years my involve ment will span half a century.

Thomas Register of American Manufacturers and Thomas Register Catalog File Springer Nature

Vols. for 1970-71 includes manufacturers catalogs.

IPC J-STD-001H Requirements for Soldered Electrical and Electronic Assemblies William Andrew

Adhesives are widely used in the manufacture and assembly of electronic circuits and products. Generally, electronics design engineers and manufacturing engineers are not well versed in adhesives, while adhesion chemists have a limited knowledge of electronics. This book bridges these knowledge gaps and is useful to both groups. The book includes chapters covering types of adhesive, the chemistry on which they are based, and their properties, applications, processes, specifications, and reliability. Coverage of toxicity, environmental impacts and the regulatory framework make this book particularly important for engineers and managers alike. The third edition has been updated throughout and includes new sections on nanomaterials, environmental impacts and new environmentally friendly 'green' adhesives. Information about regulations and compliance has been brought fully up-to-date. As well as providing full coverage of standard adhesive types, Licari explores the most recent developments in fields such as: • Tamper-proof adhesives for electronic security devices. • Bio-compatible adhesives for implantable medical devices. • Electrically conductive adhesives to replace toxic tin-lead solders in printed circuit assembly – as required by regulatory regimes, e.g. the EU's Restriction of Hazardous Substances Directive or RoHS (compliance is required for all products placed on the European market). • Nano-fillers in adhesives, used to increase the thermal conductivity of current adhesives for cooling electronic devices. A complete guide for the electronics industry to adhesive types, their properties and applications – this book is an essential reference for a wide range of specialists including electrical engineers, adhesion chemists and other engineering professionals Provides specifications of adhesives for particular uses and outlines the processes for application and curing – coverage that is of particular benefit to design engineers, who are charged with creating the interface between the adhesive material and the microelectronic device Discusses the respective advantages and limitations of different adhesives for a varying applications, thereby addressing reliability issues before they occur and offering useful information to both design engineers and Quality Assurance personnel

Lead-free Electronics Newnes

MEMS sensors and actuators are enabling components for smartphones, AR/VR, and wearable electronics. MEMS packaging is recognized as one of the most critical activities to design and manufacture reliable MEMS. A unique challenge to MEMS packaging is how to protect moving MEMS devices during manufacturing and operation. With the introduction of wafer level capping and encapsulation processes, this barrier is removed successfully. In addition, MEMS devices should be integrated with their electronic chips with the smallest footprint possible. As a result, 3D packaging is applied to connect the devices vertically for the most effective integration. Such 3D packaging also paves the way for further heterogenous integration of MEMS devices, electronics, and other functional devices. This book consists of chapters written by leaders developing products in a MEMS industrial setting and faculty members conducting research in an academic setting. After an introduction chapter, the practical issues are covered: through-silicon vias (TSVs), vertical interconnects, wafer level packaging, motion sensor-to-CMOS bonding, and use of printed circuit board technology to fabricate MEMS. These chapters are written by leaders developing MEMS products. Then, fundamental issues are discussed, topics including encapsulation of MEMS, heterogenous integration, microfluidics, solder bonding, localized sealing, microsprings, and reliability. Contents: Introduction to MEMS Packaging (Y C Lee, Ramesh Ramadoss and Nils Hoivik)Silex's TSV Technology: Overview of Processes and MEMS Applications (Tomas Bauer and Thorbjörn Ebefors)Vertical Interconnects for High-end MEMS (Maaike M Visser Taklo and Sigurd Moe)Using Wafer-Level Packaging to Improve Sensor Manufacturability and Cost (Paul Pickering, Collin Twanow and Dean Spicer)Nasiri Fabrication Process for Low-Cost Motion Sensors in the Consumer Market (Steven Nasiri, Ramesh Ramadoss and Sandra Winkler)PCB Based MEMS and Microfluidics (Ramesh Ramadoss, Antonio Luque and Carmen Aracil)Single Wafer Encapsulation of MEMS Resonators (Janna Rodriguez and Thomas Kenny)Heterogeneous Integration and Wafer-Level Packaging of MEMS (Masayoshi Esashi and Shuji Tanaka)Packaging of Membrane-Based Polymer Microfluidic Systems (Yu-Chuan Su)Wafer-Level Solder Bonding by Using Localized Induction Heating (Hsueh-An Yang, Chiung-Wen Lin and Weileun Fang)Localized Sealing Schemes for MEMS Packaging (Y T Cheng, Y C Su and Liwei Lin)Microsprings for High-Density Flip-Chip Packaging (Eugene M Chow and Christopher L Chua)MEMS Reliability (Chien-Ming Huang, Arvind Sai SarathiVasan, Yunhan Huang, Ravi Doraiswami, Michael Osterman and Michael Pecht) Readership: Researchers and graduate students participating in research, R&D, and manufacturing of MEMS products; professionals associated with the integration for systems represented by smartphones, AR/VR, and wearable electronics. Keywords: MEMS;Packaging;Microelectromechanical Systems;Reliability;Microstructures;Sensors;ActuatorsReview: Key Features: The book covers engineering topics critical to product development as well as research topics critical to integration for future MEMS-enabled systemsIt is a major resource for those participating in MEMS and for every professional associated with the integration for systems represented by smartphones, AR/VR and wearable electronics

Optimum Cooling of Data Centers Springer Science & Business Media

DESIGN FOR EXCELLENCE IN ELECTRONICS MANUFACTURING An authoritative guide to optimizing design for manufacturability and reliability from a team of experts Design for Excellence in Electronics Manufacturing is a comprehensive, state-of-the-art book that covers design and reliability of electronics. The authors—noted experts on the topic—explain how using the DfX concepts of design for reliability, design for manufacturability, design for environment, design for testability, and more, reduce research and development costs and decrease time to market and allow companies to confidently issue warranty coverage. By employing the concepts outlined in Design for Excellence in Electronics Manufacturing, engineers and managers can increase customer satisfaction, market share, and long-term profits. In addition, the authors describe the best practices regarding product design and show how the practices can be adapted for different manufacturing processes, suppliers, use environments, and reliability expectations. This important book: Contains a comprehensive review of the design and reliability of electronics Covers a range of topics: establishing a reliability program, design for the use environment, design for manufacturability, and more Includes technical information on electronic packaging, discrete components, and assembly processes Shows how aspects of electronics can fail under different environmental stresses Written for reliability engineers, electronics engineers, design engineers, component engineers, and others, Design for Excellence in Electronics Manufacturing is a comprehensive book that reveals how to get product design right the first time.

IPC-HDBK-001H Handbook and Guide to Supplement J-STD-001 CRC Press

MEMs Materials and Processes Handbook" is a comprehensive reference for researchers searching for new materials, properties of known materials, or specific processes available for MEMS fabrication. The content is separated into distinct sections on "Materials" and "Processes". The extensive Material Selection Guide" and a "Material Database" guides the reader through the selection of appropriate materials for the required task at hand. The "Processes" section of the book is organized as a catalog of various microfabrication processes, each with a brief introduction to the technology, as well as examples of common uses in MEMs.

Design for Excellence in Electronics Manufacturing Springer Science & Business Media

Significant progress has been made in advanced packaging in recent years. Several new packaging techniques have been developed and new packaging materials have been introduced. This book provides a comprehensive overview of the recent developments in this industry, particularly in the areas of microelectronics, optoelectronics, digital health, and bio-medical applications. The book discusses established techniques, as well as emerging technologies, in order to provide readers with the most up-to-date developments in advanced packaging.

High-speed Circuit Board Signal Integrity Springer

The book focuses on the design, materials, process, fabrication, and reliability of advanced semiconductor packaging components and systems. Both principles and engineering practice have been addressed, with more weight placed on engineering practice. This is achieved by providing in-depth study on a number of major topics such as system-in-package, fan-in wafer/panel-level chip-scale packages, fan-out wafer/panel-level packaging, 2D, 2.1D, 2.3D, 2.5D, and 3D IC integration, chiplets packaging, chip-to-wafer bonding, wafer-to-wafer bonding, hybrid bonding, and dielectric materials for high speed and frequency. The book can benefit researchers, engineers, and graduate students in fields of electrical engineering, mechanical engineering, materials sciences, and industry engineering, etc.

Advanced Structural Materials Bloomsbury Publishing

The development of electronics that can operate at high temperatures has been identified as a critical technology for the next century. Increasingly, engineers will be called upon to design avionics, automotive, and geophysical electronic systems requiring components and packaging reliable to 200 °C and beyond. Until now, however, they have had no single resource on high temperature electronics to assist them. Such a resource is critically needed, since the design and manufacture of electronic components have now made it possible to design electronic systems that will operate reliably above the traditional temperature limit of 125 °C. However, successful system development efforts hinge on a firm understanding of the fundamentals of semiconductor physics and device processing, materials selection, package design, and thermal management, together with a knowledge of the intended application environments. High Temperature Electronics brings together this essential information and presents it for the first time in a unified way. Packaging and device engineers and technologists will find this book required reading for its coverage of the techniques and tradeoffs involved in materials selection, design, and thermal management and for its presentation of best design practices using actual fielded systems as examples. In addition, professors and students will find this book suitable for graduate-level courses because of its detailed level of explanation and its coverage of fundamental scientific concepts. Experts from the field of high temperature electronics have contributed to nine chapters covering topics ranging from semiconductor device selection to testing and final assembly.

High Temperature Electronics John Wiley & Sons

POLLUTANTS AND WATER MANAGEMENT Pollutants and Water Management: Resources, Strategies and Scarcity delivers a balanced and comprehensive look at recent trends in the management of polluted water resources. Covering the latest practical and theoretical aspects of polluted water management, the distinguished academics and authors emphasize indigenous practices of water resource management, the scarcity of clean water, and the future of the water system in the context of an increasing urbanization and globalization. The book details the management of contaminated water sites, including heavy metal contaminations in surface and subsurface water sources. It details a variety of industrial activities that typically pollute water, such as those involving crude oils and dyes. In its discussion of recent trends in abatement strategies, Pollutants and Water Management includes an exploration of the application of microorganisms, like bacteria, actinomycetes, fungi, and cyanobacteria, for the management of environmental contaminants. Readers will also discover a wide variety of other topics on the conservation of water sources including: The role of government and the public in the management of water resource pollution The causes of river system pollution and potential future scenarios in the abatement of river pollution Microbial degradation of organic pollutants in various water bodies The advancement in membrane technology used in water treatment processes Lead contamination in groundwater and recent trends in abatement strategies for it Highly polluting industries and their effects on surrounding water resources Perfect for graduate and postgraduate students and researchers whose focus is on recent trends in abatement strategies for pollutants and the application of microorganisms for the management of environmental contaminants, Pollutants and Water Management: Resources, Strategies and Scarcity also has a place in the libraries of environmentalists whose work involves the management and conservation of polluted sites.

Reflow Soldering Processes Springer Science & Business Media

The objective of this book is to assist scientists and engineers select the ideal material or manufacturing process for particular applications; these could cover a wide range of fields, from light-weight structures to electronic hardware. The book will help in problem solving as it also presents more than 100 case studies and failure investigations from the space sector that can, by analogy, be applied to other industries. Difficult-to-find material data is included for reference. The sciences of metallic (primarily) and organic materials presented throughout the book demonstrate how they can be applied as an integral part of spacecraft product assurance schemes, which involve quality, material and processes evaluations, and the selection of mechanical and component parts. In this successor edition, which has been revised and updated, engineering problems associated with critical spacecraft hardware and the space environment are highlighted by over 500 illustrations including micrographs and fractographs. Space hardware captured by astronauts and returned to Earth from long durations in space are examined. Information detailed in the Handbook is applicable to general terrestrial applications including consumer electronics as well as high reliability systems associated with aeronautics, medical equipment and ground transportation. This Handbook is also directed to those involved in maximizing the relia bility of new materials and processes for space technology and space engineering. It will be invaluable to engineers concerned with the construction of advanced structures or mechanical and electronic sub-systems.